ENGR 2304: Computing for Engineers (EE Students)

EE Sections 03E & 04E Course Syllabus, Fall 2025

Rev 2, 8/12/2025

INSTRUCTOR INFORMATION

Instructor	Gerald L. Fudge, PhD
Office Location	217
Office Hours	Monday – Friday, except Wed. (10:00 am – 11:00 am) Wednesday (10:00 am – 11:30 am) Also, by appointment at other times
Phone	Engineering &Technology Office: 903-886-5474
University Email Address	Gerald.Fudge@etamu.edu
Preferred Form of Communication	Email
Communication Response Time	Typically within 48 hours on weekdays for email

COURSE INFORMATION

Class Meeting Schedule	See schedule at end of syllabus
Class Meeting Days & Classroom	03E: T / TH, 12:30 pm – 1:45 pm, 118A 04E, W, 4:20 pm – 6:50 pm 4:20 pm – 5:20 pm, 214 5:21 pm – 6:50 pm, 118A
Textbooks Required	Machine Learning for Absolute Beginners: A Plain English Introduction (Third Edition), by Oliver Theobald. (ISBN-13: 979-8558098426); kindle or paperback.
Software Required	• Microsoft Office • MATLAB (can use school computers) • Python Anaconda package (open source; can use school computers or download to personal computers)

The syllabus/schedule are subject to change

COURSE DESCRIPTION

The purpose of this class is to introduce students to the basic fundamentals of how to identify, formulate and analyze problems based on the knowledge of mathematics, science and engineering by using modern computing techniques. Concepts gained will pave the way to more advanced problem framing and selection of appropriate programming computing approaches. Students will solve problems using MATLAB, Python, and Excel. Prerequisites: MATH 2413 (Calculus I with min grade C.)

Student Learning Outcomes

Upon successful completion of this course, students will achieve the following learning outcomes in the below five areas:

1 Computational Programming:
   - Demonstrate computational programming using structured MATLAB and object-oriented Python while following a set of specific software requirements
   - Demonstrate ability to use generate AI properly as a coding aid, including analyzing existing code, code tutorial, and generating / testing code modules that meet all software requirements
   - Demonstrate ability to develop algorithms, including histogram, pulse detection & measurement, spectrogram, and least squares polynomial regression

2 Matrix Math:
   - Demonstrate proficiency in matrix math, including matrix vector multiplication and inner products
   - Demonstrate conceptual understanding of solving linear systems of equations, including full rank systems and systems with less than full rank.
   - Be able to use computational tools to solve linear systems, including full rank and less than full rank

3 Data Visualization
   - Demonstrate data visualization techniques, including line plot, scatter plot, histogram, box plot, and heat map, with appropriate interpretation and with correct plot labeling to support reproducibility

4 Analysis
   - Demonstrate time domain processing & analysis, including filtering, convolution, threshold detection, and measurement in the time domain
   - Demonstrate frequency domain processing & analysis using the Discrete Fourier Transform and including proper axis labeling and interpretation of plot
   - Demonstrate time-frequency domain processing & analysis using the spectrogram, including proper axis labeling and interpretation

5 Machine Learning:
   - Demonstrate ability to properly use basic machine learning (ML) tools for clustering, regression, and classification
   - Demonstrate understanding of important ML concepts, including supervised vs. unsupervised training, overfit vs. underfit, classification vs. regression vs. clustering, data scrubbing and other preprocessing steps, sample bias, the curse of dimensionality, performance metrics, and training vs. test & verification

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Prerequisites: MATH 2413 (Min Grade C). Students must be able to access the Internet, use the D2L learning management system, and use Microsoft Office tools (Word, Excel, PowerPoint). Experience in programming, linear algebra & matrix math, and probability & statistics is helpful, but not required.

Instructional Methods

This is a Learning Assistant (LA) enhanced course. The instructional methods in this course include lectures, class discussion and participation, written assignments, quizzes problem solving, and assignments using MATLAB, Python, and Excel. In addition, the LA will provide additional one-on-one support, both in class and outside of class.

Student Responsibilities or Tips for Success in the Course

- **Attendance & Participation**: For optimum learning and grades, students need to attend class and participate; note that attendance and participation is a graded component.
- **Engage with the Instructor and LA**: The instructor and Learning Assistant are there to help you learn. The material in this class can be very difficult, so don't wait to get help.
- **Homework**: The homework will consist primarily of computational coding assignments due approximately once per week to provide the coding experience required to develop competence in computational engineering. We will discuss selected student homework solutions during class, including code errors, lessons learned, problems encountered, and innovative approaches. Late work may be penalized, including a grade of zero, unless student has an acceptable excuse with a doctor's note or other legal documentation.
- **Supplemental assignments**: The supplemental assignments will include watching selected videos and completing assigned reading.
- **Homework Collaboration**: Students must turn in their own work, but student collaboration to help work through solutions, debug code, fix style errors, etc., is strongly encouraged.
- **Submission of Assignments**: Students shall submit assignments in D2L. If problems are encountered using D2L, then email may be used as a backup with instructor permission.
- **Quizzes**: Quizzes will be used to assess problem solving skills and provide student feedback. Student should bring a scientific calculator to class for quizzes.
- **Exams**: The exams will be closed book & closed notes, and will include a combination of written response questions and writing pseudo-code. The use of a personal phone is strictly prohibited during exams. Makeup exams may be offered with suitable documentation that fulfills University procedures provided to the instructor in a timely manner.
- **Use of Artificial Intelligence (AI) Tools**: Other than as directed by the instructor, the use of generative AI for assignments and exams is prohibited. When generative AI is allowed, the use of such software must be appropriately documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism). Students will be expected to use generative AI on some assignments, but only as specified in the assignment directions.

GRADING

Final grades in this course will be based on the following scale:

A	B	C	D	F
100 - 90	89 - 80	79 - 70	69 - 60	59 – 0

Overall grades will be based on a weighted average as shown below:

Assessment Type	**Percent**
Participation and Attendance	10
Supplemental Assignments	10
Quizzes	10
Homework	30
Exams	30
Project	10
Total	**100**

Note: The homework grades will be based on accuracy, efficiency of solution, proper labeling of plots, and coding style. There may also be opportunities for bonus points; these will be discussed in class.

COURSE OUTLINE / CALENDAR

Wk.	**Days**			**Weekly Topic Plan** **Weeks 1-10: MATLAB** **Weeks 11-15: Python**	**Notes**	**HW Assignment Plan**
	Tue	Thu	*Wed*			
1	8/26	8/28	*8/27*	1. Overview, scripts, syntax, variables, plots		1. Templates 2. Real sinusoid
2	9/2	9/4	*9/3*	2. Complex sinusoids, magnitude, pulsed data	**9-1: Holiday**	3, 4: Complex sinusoids
3	9/9	9/11	*9/10*	3. User functions, load data, histogram	**9-10: Census**	5. Histogram function & demo
4	9/16	9/18	*9/17*	4. Convolution, noise, LPF noise reduction, SNR		6. Low pass filter (LPF)
5	9/23	9/25	*9/24*	5. SNR, logic functions & indices; edge detect HFP		7. High pass filter (HPF)
6	9/30	10/2	*10/1*	6. Pulse detection, matrix math, inner product		8. Time domain pulse detection
7	10/7	10/9	*10/8*	7. Frequency domain: DFT		9. Inner product & matrix math
8	10/14	10/16	*10/15*	8. Time frequency: spectrogram		10. Frequency domain: DFT
9	10/21	10/23	*10/22*	9. Review, oral exam, written exam	**Exams (two)**	
10	10/28	10/30	*10/29*	10. Linear systems, least squares regression		11.Time frequency: spectrogram
11	11/4	11/6	*11/5*	11. Intro to ML, regression & clustering with ML tools	**Project kickoff**	12. Polynomial regression (MATLAB)
12	11/11	11/13	*11/12*	12. Classification with ML tools, project time		13. Polynomial regression (Python)
13	11/18	11/20	*11/19*	13. Working with ML tools, project time		14. ML Classifiers & Clustering
14	11/25	11/27	*11/26*	14. Project time	**Thanksgiving**	
15	12/2	12/4	*12/3*	15. Final exam review, presentations	**Projects due!**	
16				Finals Week	**Final Exam**	

Notes:

1. The weekly topic and HW assignment plans are notional, and may be revised by the instructor as needed
2. Unless otherwise specified by D2L, HW is due on Thursdays at 11:59 pm
3. Quizzes and quiz assignments are assigned by the instructor as needed in D2L

The syllabus/schedule are subject to change

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

You can ask questions any time before, during, and after lectures or office hours face to face. You can also send an e-mail. Please expect an answer within few hours for e-mails.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

ü Late work will not be accepted and a grade of "0" will be assigned, unless prior arrangements are worked out with the instructor. Late penalties will be assessed to any prior-arranged approved late work, 20% off per day.

- A make-up exam/quiz is allowed only if the student informs the instructor before the exam due date and provides a doctor's note with an acceptable health excuse. Family emergencies are not accepted as a reason for make-up exams.

ü Attendance is mandatory. The instructor takes attendance for every class.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: Netiquette
http://www.albion.com/netiquette/corerules.html

ETAMU Attendance
For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity
Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:
East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors 'guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
East Texas A&M University
Velma K. Waters Library Rm 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice
East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and East Texas A&M University Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

East Texas A&M University Supports Students' Mental Health
The Counseling Center at East Texas A&M University located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit **www.tamuc.edu/counsel**.